

REMARKS

Claims 1-5 and 7-24 are pending in the application. Claim 6 has been cancelled.

Claims 3 and 18 are rejected under 35 U.S.C. 112, for having insufficient antecedent basis for certain limitations.

Claims 1-4, 11-13, 17, 19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by one of U.S. Patent No. 3,305,740 issued to Shano and U.S. Patent No. 6,107,719 issued to Asao.

Claims 5-10, 14-16, 18, 20, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over various combinations of Shano, Asao, U.S. Patent No. 5,081,383 issued to Kusumoto et al., and U.S. Patent 5,943,760 issued to Barzideh et al.

The Present Invention

The present invention provides a rotor assembly including a bobbin assembly having an expandable slit or split. The expandable slit extends completely radially and completely axially through a section of the bobbin. In other words, the slit is a cut completely through a section of the bobbin assembly.

After the field coil has been wound around the bobbin assembly, the bobbin assembly is pressed onto the pole hub. The slit allows the bobbin to expand with and stretch the field coil wire resulting in securely locking the wire to the bobbin and the bobbin to the pole hub. The slit also prevents pinching of the bobbin material between the pole hub surfaces.

Claim Rejections Under 35 USC §112

The Examiner rejected Claims 3 and 18 under 35 U.S.C. §112 as being indefinite. The amended claims 3 and 18 have addressed the lack of antecedent basis kindly pointed out by the Examiner. Applicants believe that claims 3 and 18 as amended, particularly point out and distinctly claim the subject matter which Applicants regard as the invention and therefore are patentable and fulfill the requirements of 35 U.S.C § 112.

Claim Rejections Under 35 USC § 102**The Shano Reference**

The Examiner has rejected Claims 1-4, and 11-13 as being anticipated by Shano. Shano discloses a rotor assembly having a sleeve member, similar to Applicant's bobbin, that is formed with an inwardly disposed lap joint. The sleeve member is mounted on hub portions and holds a wound inductance coil. The hub portions each have an axial groove mutually aligned to receive therein the lap joint of the sleeve. This configuration secures the sleeve member against rotation relative to the hub portions. "This lap joint 63 fits into grooves 65 and 66 formed on the surface of hubs 30 and 31. Grooves 65 and 66 are aligned to receive the inwardly extending lap joint 63. Of course, it would be possible to form other types of keying arrangements within the scope of the invention, however, the lap joint 63 is a convenient way of constructing the sleeve while at the same time forming a key." Shano, Column 3, lines 7-14.

A lap joint, as defined in Merriam-Webster's Collegiate Dictionary, Tenth Edition, is "a joint made by overlapping two ends or edges and fastening them together." A lap joint is therefore fixed together and does not have the ability to expand, which is a limitation in Applicant's amended claim 1. Therefore, Shano does not disclose or teach an expandable slit that allows the bobbin to expand and stretch the field coil wire to get a tight fit, as taught in amended claim 1. Rather, the only purpose of the lap joint in Shano is to orient and prevent the sleeve member, or bobbin, from rotating relative to the hub portions.

Similarly with respect to claims 2, a limitation is that the bobbin includes an expandable slit. Shano teaches a sleeve member having a fixed lap joint that, as previously established, does not expand. Therefore, claim 2 is patentable over Shano.

With respect to claims 3-4 and 11-13, each of these claims depends on claim 2 and are therefore patentable for at least the same reasons as stated in support of claim 2.

The Asao Reference

The Examiner has rejected claims 17, 19, and 21 as being anticipated by Asao. Asao discloses a rotor for an automotive alternator including a cylindrical bobbin. The bobbin has a cylindrical portion and a pair of first and second annular flange portions projecting perpendicularly from both ends of the cylindrical portion. A recessed groove is disposed in an inner wall of the first flange portion at an angle to a radial direction of the cylindrical portion.

There is also an anchor portion disposed on the outer circumferential portion of the first flange portion in close proximity to the outer circumferential end of the recessed groove. The starting end of the field winding is wound around the anchor portion, housed in the recessed groove, and drawn from an inner circumferential end of the recessed groove onto the outer circumferential surface of the cylindrical portion of the bobbin. "The broad surface of the flatly shaped lead wire 15a is housing in the recessed groove 161 so as to closely contact the bottom of the recessed groove 161." Column 2, lines 17-19.

A groove, as defined in Merriam-Webster's Collegiate Dictionary, Tenth Edition, is "a long narrow channel or depression." Asao does not disclose or teach an expandable split in the bobbin assembly as stated in claim 17. Further, claim 17 requires that the expandable split be positioned on the rigid sleeve, not the first end cap. Asao does not teach or disclose this limitation for at least two reasons. First, the groove in Asao is not an expandable split or cut through the bobbin. Second, the groove in Asao is only included on the inner surface of one flange of the bobbin assembly. Therefore, the present invention, as claimed, is patentable over Asao.

With respect to claims 19 and 21, these claims include all the limitations of independent claim 17 from which they depend, therefore claims 19 and 21 are patentable for at least the same reasons as given above in support of claim 17.

Claim Rejections Under 35 USC § 103

The Examiner has rejected claims 5-8 as being unpatentable over Shano in view of Kusumoto. Claim 6 has been cancelled. Claims 5 and 7-8 have been amended to depend directly on independent claim 2. As explained previously, Shano discloses a

sleeve member having a fixed, non-expandable lap joint and hub portions having grooves for receiving the lap joint to prevent relative rotation between the sleeve member and the hub portions. Shano does not include an expandable split, since the lap joint is fixed and not capable of expanding.

Kusumoto discloses a rotor for a vehicle dynamo including a bobbin having a cylindrical portion and a pair of opposed flange portions radially extending from the cylindrical portion forming an annular channel for receiving a field coil. The bobbin is also provided with a ventilation opening thereon. The purpose of the at least one ventilation opening is to allow more efficient heat transfer from the field coil. As explained in Column 2, lines 18-22, "Consequently, an increase in temperature of the field coil 5 is controlled to minimize an increase in the electrical resistance so that a decrease in the output current due to the decreased field current at hot conditions or in a high atmosphere is minimized." Kusumoto does not disclose or teach an expandable split.

Further, the ventilation opening disclosed in Kusumoto does not extend completely through the radial sections, or flange portions, of the bobbin. Applicant's amended claims teach that the expandable split extend completely axially and completely radially through a section of the bobbin.

Therefore, neither Shano nor Kusumoto taken together or separately teach or suggest the Applicants' invention, as now claimed.

The Examiner has rejected claims 9-10 as being unpatentable over Shano and Kusumoto as applied to claim 5 above, and further in view of Barzideh et al. Claims 9 and 10 ultimately depend on independent claim 2. Barzideh discloses a method of making a stepper motor for use in a camera, printer or scanner, wherein some components are injection molded. Barzideh does not disclose a rotor assembly having an expandable split. Therefore, neither Shano, Kusumoto, nor Barzideh taken together or separately teach or suggest the Applicants' invention, as now claimed.

The Examiner has rejected claim 14 as being unpatentable over Shano. Claim 14 is dependent on claim 2. As explained above, Shano does not disclose an split

through a section of the bobbin assembly for allowing the bobbin to expand. Rather, Shano discloses a fixed lap joint having the sole purpose of acting as a key, and therefore does not expand. Therefore, Shano does not teach or suggest the Applicants' invention, as now claimed.

The Examiner has rejected claim 16 as being unpatentable over Shano as applied to claim 2 above, and further in view of Barzideh. Claim 16 is dependent on claim 2. Therefore, as explained previously, neither Shano nor Barzideh taken together or separately teach or suggest the Applicants' invention, as now claimed.

The Examiner has rejected claims 15, 18, 22-24 as being unpatentable over Shano in view of Asao. Claim 15 is ultimately dependent on independent claim 2.

Similarly, claims 18 and 22-24 are ultimately dependent on independent claim 17. Both claims 2 and 17 teach a rigid sleeve having an expandable split. Shano discloses a lap joint that does not allow the assembly to expand. Further, Asao discloses a recessed groove disposed in an inner wall of the first flange portion at an angle to a radial direction of the cylindrical portion. The recessed groove is not a split. Rather, it receives the field coil. Therefore, neither Shano nor Asao taken together or separately teach or suggest the Applicants' invention, as now claimed.

The Examiner has rejected claim 20 as being unpatentable over Asao as applied to claim 17 above, and further in view of Barzideh. Claim 20 is dependent on independent claim 17.

Claim 17 teaches a bobbin assembly comprising a rigid sleeve having an expandable split, a first end cap and a second end cap. The first and second end caps are not unitarily formed with the sleeve. Neither Asao nor Barzideh teach a bobbin assembly that is not unitarily formed having an expandable split. Therefore, since claim 20 is dependent on independent claim 17, neither Asao nor Barzideh taken together or separately teach or suggest the Applicants' invention as now claimed.

SUMMARY

Pending Claims 1-5 and 7-24 as amended are patentable. Applicants respectfully request the Examiner grant early allowance of these claims. The Examiner is invited to contact the undersigned attorneys for the Applicant via telephone if such communication would expedite this application.

Respectfully submitted,

Dated: January 29, 2003

By: 

Eric Sosenko
Registration No. 34,440
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
Telephone: (734) 302-6000

APPENDIX A
Version with Markings to Show Changes Made

[00031] Shown in FIGURE 3, the excitation winding 48 is wound or wrapped around the bobbin assembly 42. The outer flaps 60, 62 on the first and second sidewalls 56, 58 are folded down over the excitation winding 48. The excitation winding wound bobbin is also known as the coil-bobbin assembly 64. The coil-bobbin assembly 64 is then assembled onto the first pole piece 66, which is one part of the pole assembly 68 (shown in FIGURE 4.)

[00033] There are a total of two pole pieces 66, 80, comprising the pole assembly 68. The second or rear pole piece 80 is a mirror image of the first pole piece 66. Therefore, the second pole piece also is generally star shaped including an integrated hub 82 in the center, fingers 84 that surround the periphery of the pole piece 80, and a valley 86 positioned between the outer diameter of the hub 88 and the fingers 84. The second pole piece 80 is positioned with respect to the coil-bobbin assembly 64 so that the fingers 84 are misaligned with the fingers 72 on the first pole piece 66 and press fit onto the coil-bobbin assembly 64. The pole assembly 68 could also include a groove 90 that aligns with the expandable seam 44 of the bobbin assembly 42. The groove 90 helps to prevent the excitation winding 48 from slipping into the expandable split 44.

1. (AMENDED) A bobbin for use in an electrical machine comprising a bobbin having an expandable slit extending completely across [through] a section of the bobbin.

2. (AMENDED) A rotor assembly for use in an electrical machine, the assembly comprising:

a bobbin assembly having a split extending completely axially and completely radially through a section of the bobbin assembly for allowing the bobbin to expand;

an excitation winding wrapped around the bobbin assembly; and

a pole assembly for receiving the bobbin wrapped with the excitation winding.

3. (AMENDED) The rotor assembly of claim 2 wherein the pole assembly includes a front pole [section] piece and a rear pole piece, the pole assembly including an integrated hub for receiving the bobbin wrapped with the excitation winding.

5. (AMENDED) The rotor assembly of claim 2 wherein the bobbin assembly comprises a first end cap including the expandable split, a second end cap including the expandable split, and a rigid sleeve including the [having an] expandable split, wherein the first and second end caps are attached to the rigid sleeve.

7. (AMENDED) The rotor assembly of claim 5 [6] wherein the expandable splits on the first end cap, second end cap and rigid sleeve are aligned.

17. (AMENDED) A bobbin assembly for use in an electrical machine, the assembly comprising:

a first end cap;

a second end cap;

a rigid sleeve having an expandable split;

wherein the first end cap and second end cap are attached to the rigid sleeve and not unitarily formed with the sleeve.

18. (AMENDED) The bobbin assembly of claim 17 wherein the bobbin assembly is used in a rotor assembly, the rotor assembly further comprising:

an excitation winding wrapped around the bobbin assembly; and

a pole assembly including a front pole [section] piece and a rear pole [section] piece, the pole assembly including an integrated hub for receiving the bobbin assembly wrapped with the excitation winding.